

Child Restraint Laws: An Analysis of Gaps in Coverage

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Abstract: The limiting effects of exemptions to the coverage of child restraint laws were estimated by determining the extent to which the laws would have applied to child motor vehicle occupants, ages 0–5 years, killed before the laws were passed (1976–80). The 50 state laws would have exempted about 39 per cent of child motor vehicle occupants less than 6 years of age killed in the years

immediately preceding enactment of the laws. Of those children killed in pre-law years who were within the age limits set by the subsequent state laws, about 21 per cent would not have been covered. The gaps in the laws are unnecessary, and proper amendments based on these data can save lives. (*Am J Public Health* 1986; 76:31–34.)

Introduction

Between 1977 and 1985, all 50 states passed laws to protect infants and children as occupants of motor vehicles. Starting with the nation's first child restraint law in Tennessee, effective January 1, 1978, the exigencies of politics have helped shape the laws' provisions. As originally passed (but subsequently amended), Tennessee's law permitted a child to be held in the arms of an older passenger as an alternative to the use of a child restraint system. Although less than desirable for optimum child safety,^{1,2} this alternative facilitated the passage of the bill.

Rhode Island passed the next child restraint law, which went into effect July 1, 1980, and was substantially different from the Tennessee law. The Tennessee law covered children under 4 years of age who were residing in the state and being driven by parents or legal guardians in a vehicle owned by parents. The Rhode Island law originally applied to all drivers of children under age 4, but only if the children were in the front seat of the vehicle.

With more laws came additional variations. The age of the child, the type of the vehicle, the registration of the vehicle, and other factors determined the law's application in certain states. There was little uniformity among the laws, and in each state some children were excluded from coverage. Other countries that have seat belt use laws for adults have also typically exempted certain groups of motor vehicle occupants. These exemptions have limited the effectiveness of the laws because use rates in the exempted populations do not increase, or they increase less than in populations the laws cover.^{3,4} Thus, even if 100 per cent compliance could be achieved among those covered by the law, some portion of the population would be unaffected.

Injury information made available to legislators in a useful format can influence the content of child restraint laws. For example, in 1979 Baker⁵ analyzed the age-specific death rates for child motor vehicle passengers under the age of 12. This information was useful in determining the age range to be covered by states' laws.

Additional information on vehicle types, state of registration, and state of driver licensure has not previously been analyzed. Child restraint laws have been written and amended without full knowledge of the effects of the various options available for protecting the population at risk. The present

study provides previously unavailable information to assist legislators in addressing the problem of childhood motor vehicle injuries, the leading cause of childhood death, by examining the gaps in coverage of existing child restraint laws.

Methods

The full text of the child restraint law for each state was analyzed and categorized for coverage characteristics. Laws in effect on January 1, 1984 were analyzed as they existed on that date, whether in amended or original form. Laws passed subsequent to January 1, 1984 were analyzed in their original form. Information was abstracted to describe the law's coverage limitations using the following categories: child's age; registration status of the vehicle; vehicle type; person driving the vehicle; road on which the vehicle is being driven; and other exceptions to coverage, e.g., seating position.

Using the Fatal Accident Reporting System (FARS) data tapes compiled by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration, data from any fatal crash in which a child motor vehicle occupant was killed were extracted for the years 1976 through 1980. Children killed when traveling in vehicles not equipped with seat belts, such as motorcycles, were excluded. The analysis was limited to children under 6 years of age. Although there is no compelling reason why child restraint laws should be limited to these ages, at the time of the study age 5 was the oldest age covered by any child restraint law in effect.

As of December 31, 1980, only Tennessee and Rhode Island had mandatory child restraint use laws in effect. Of the deaths analyzed in this study, 99 per cent occurred at a time when restraint use was not legally required for children.

Information concerning the children who died was analyzed to determine whether they would have been covered by the law of the state in which the death occurred. If not covered, the provisions of the law that excluded the child were identified.

Results

At the time of data collection, the age limit for coverage was under 6 years of age in five states (10 per cent); under 5 years of age in 15 states (30 per cent); under 4 years in 25 states (50 per cent); under 3 years in one state (2 per cent); and under 2 years in four states (8 per cent).

Twenty-nine states (58 per cent) exempted children traveling in vehicles not registered in that state; 17 (34 per cent) exempted children traveling with out-of-state drivers; 45 (90 per cent) exempted certain vehicle types, e.g. pickups and large trucks; 18 (36 per cent) exempted children not being

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TABLE 1—Distribution of Child Occupants Ages 0–5 Killed in Motor Vehicle Crashes, 1976–80

Age (years)	Number of Children	Per Cent of Children
<1	930	23
1	698	17
2	747	19
3	594	15
4	538	13
5	513	13
TOTAL	4,020	100

SOURCE: Fatal Accident Reporting System data 1976–80.

TABLE 2—Distribution of Child Occupants Ages 0–5 Years Killed in Motor Vehicle Crashes, 1976–80, by Vehicle Body Type

Vehicle Body Type	Number of Children	Per Cent of Children
Passenger autos	3,223	80
Pickup trucks	491	12
Vans	117	3
Trucks other than pickups	75	2
Others	114	3
TOTAL	4,020	100

driven by their parents or guardians; and 38 (76 per cent) provided exemptions for various other reasons, e.g., seating position and certain medical conditions.

Excluding 65 children who died as passengers of vehicles without seat belts, 4,020 children under 6 years of age were killed as occupants of motor vehicles in the 50 states in 1976–80. The age distribution of these children is given in Table 1. The distributions of the deaths by vehicle type are given in Table 2. The largest group, 80 per cent, were riding in passenger automobiles. However, a substantial proportion (15 per cent) were occupants of pickup trucks or vans, vehicle types excluded by some state laws. Of the 4,020, 593 (15 per cent) were occupants of cars registered in states other than the state in which the crash occurred, and 592 (15 per cent) were being driven by a non-resident of the state.

Table 3 presents a state-specific breakdown by scope of coverage of the 4,020 deaths. The total number of child occupants killed in a state (column a) is broken down into three groups: the percentage of the total not covered because of all exemptions including age (column b); the total number of child occupants killed who were covered by the age limit set by that state's law (column c); and the percentage of those who were covered by age that were exempted due to out-of-state residence of the driver, out-of-state registration of the vehicle, restrictions on vehicle types covered, and restrictions regarding seating position (column d). FARS does not provide information on the family relationship of drivers and their passengers, or on medical conditions. Based on the FARS data, 35 per cent of the 4,020 deaths of child motor vehicle occupants under 6 years of age that occurred in 1976–80 would not have been covered by the subsequent laws because of these exemptions. In states with numbers large enough to compute percentages, the proportion of fatally injured occupants under age 6 not covered by the law ranged from 5 per cent in New Jersey to 76 per cent in North Carolina. In seven other states (Georgia, Kansas, Mississippi, Missouri, Montana, Utah, and Wyoming), 50 per cent or more of the child occupants in the study sample would not

have been covered by the law. In an additional 19 states, 30 to 49 per cent would not have been covered.

The age provision in a state's law is the most important determinant of the law's scope of coverage. Of the 4,020 children under 6 years of age killed during the study period, 927 (23 per cent) would not have been covered by the subsequent laws because they were older than the age limit set by the law. Of the 3,093 children who would have been covered on the basis of age, 478 (15 per cent) were not covered because of additional exemptions in the law. This proportion varied across states from zero in Nevada and New Jersey to 43 per cent in Utah. In 11 other states (Arkansas, Colorado, Idaho, Louisiana, Maryland, Missouri, Nebraska, New Mexico, North Carolina, South Dakota, and Tennessee), one-fourth or more of those within the state age limit were not covered. For all 50 states, 36 per cent of child occupants exempted for reasons other than age would have been exempted because of driver residence, 58 per cent because of vehicle registration, and 21 per cent because of vehicle type. Furthermore, four children would have been exempted because of seating position (the total of these categories exceeds 100 per cent because some children would be exempted for more than one reason).

It is important to note that the figures given in Table 3 understate the gaps in coverage afforded young passengers by the laws. Because FARS data do not indicate the relationship between drivers and child occupants, it was not possible to determine the proportion of children who died that were being driven by a parent or legal guardian. However, several observational studies of child restraint use indicate that 20 to 25 per cent of children under age 4 are not driven by their parents.^{6–8} If it is assumed that in the 18 states with this exemption, 20 per cent of the children were not traveling with a parent or legal guardian, the estimate of the percentage of children not covered is increased from 15 per cent to 21 per cent, and the estimate for all children under age 6 not covered is increased from 35 per cent to 39 per cent. The percentage of children who would not have been covered because of exemptions for medical conditions cannot be estimated reliably, but it is probably small.

Discussion

All the child passenger deaths examined in this study, with the exception of 57, occurred prior to the effective dates of applicable child restraint laws. Therefore, this is not an evaluation of the efficacy of any law in having reduced childhood mortality. Rather, it is an analysis of the proportion of coverage various legal alternatives would have provided to a population that suffered fatal injuries in motor vehicle crashes.

The data show that, although coverage is reduced by restrictive provisions concerning state of driver licensure, state of vehicle registration, seating positions, and vehicle type, the most important factor in the law is the ages covered. There is no compelling reason for a state legislature to mandate protection for a 4 year old and to fail to do so for an older child. The age limits in existing laws were set largely as a function of political expediency. They can be amended to increase coverage over time, so that as the initially covered children age, the law expands to keep those children within its coverage. Alternatively, laws can be passed requiring restraint use of all vehicle occupants, regardless of age.

The State of New York pioneered in both of these concepts. Originally, New York required children under age 5 to be restrained. Subsequently, the law was changed so that

TABLE 3—Childhood Motor Vehicle Occupant Deaths Ages 0–5 Years by State, 1976–80, and Extent to Which These Children Would Have Been Covered by Subsequent Child Restraint Laws*

State	(a) Number Killed Ages 0–5	(b) Per Cent of (a) Not Covered Because of Exemptions**	(c) Number Killed within State Law Age Limit	(d) Per Cent of (c) Not Covered Because of Exemptions**
Alabama	102	41	65	8
Alaska	7	— (N = 1)	7	— (N = 1)
Arizona ⁺	98	49	65	23
Arkansas	55	44	46	33
California	380	27	282	2
Colorado	51	47	39	31
Connecticut	14	— (N = 4)	10	— (N = 0)
Delaware ⁺	7	— (N = 2)	7	— (N = 2)
Florida ⁺	157	15	157	15
Georgia	135	50	80	16
Hawaii	12	— (N = 1)	11	— (N = 0)
Idaho ⁺	57	46	43	28
Illinois ⁺	136	17	136	17
Indiana	127	27	109	15
Iowa	60	10	60	10
Kansas ⁺	47	70	21	— (N = 7)
Kentucky ⁺	93	38	68	15
Louisiana	95	37	81	26
Maine	11	— (N = 6)	8	— (N = 3)
Maryland	40	42	36	36
Massachusetts	25	8	23	— (N = 0)
Michigan	138	32	96	2
Minnesota ⁺	64	36	49	16
Mississippi	84	68	31	13
Missouri	108	50	72	25
Montana ⁺	30	57	19	— (N = 6)
Nebraska	38	45	32	34
Nevada	28	11	25	0
New Hampshire	11	— (N = 1)	10	— (N = 0)
New Jersey	55	5	52	0
New Mexico	68	40	60	32
New York	107	27	93	16
North Carolina ⁺	134	76	44	27
North Dakota	15	— (N = 8)	11	— (N = 4)
Ohio	163	26	127	6
Oklahoma	114	17	114	17
Oregon	60	20	50	4
Pennsylvania ⁺	122	36	99	21
Rhode Island	4	— (N = 0)	4	— (N = 0)
South Carolina	78	37	56	13
South Dakota	32	37	30	33
Tennessee ⁺	101	41	83	28
Texas	408	30	315	9
Utah ⁺	56	50	49	43
Vermont	10	— (N = 5)	7	— (N = 2)
Virginia ⁺	68	47	42	14
Washington ⁺	81	18	76	13
West Virginia	35	26	29	10
Wisconsin ⁺	69	46	44	16
Wyoming ⁺	30	60	20	— (N = 8)
TOTAL	4,020	35 (N = 1,405)	3,093	15 (N = 478)

*Where state laws use a child's height rather than age as a criterion, height has been converted to nearest year of age based upon 50th percentile height for age distribution.

**Percentage not computed when denominator is less than 25.

⁺Children not traveling with parent or guardian are not covered by law, but the effect of this exemption is not taken into account in this Table (see text).

coverage would be extended up to and including age 9 by 1987. New York recently passed a law, effective December 1, 1984, requiring that all front seat passengers, and all rear seat passengers under age 10, be appropriately restrained. Other states have followed the lead of New York in passing seat belt laws that cover adult as well as child occupants.

The statutory language used to describe age limitations can be ambiguous. The Arizona law, for example, refers to "a child four or less years of age . . ." Language of this type leaves doubt as to whether it includes a child between ages 4 and 5. Arizona interprets its law to include only children

under 4 years of age. One could argue, however, that until a child turns 5, he or she is "four or less years of age" and thus is included within the intention of the law's words. A solution to this ambiguity is the use of statutory language such as "all children under 5 years of age."

The laws of some states require children to be restrained only if the vehicle involved is registered in that state. Such a restriction of coverage is legally unnecessary; for example, states control the speed of cars on their roads, regardless of the car's state of registration. The policy of restricting child restraint law coverage costs lives. In Missouri, for example,

where only vehicles registered in Missouri fall within the ambit of the law, 27 (25 per cent) of the 108 child deaths were to occupants of vehicles registered outside of Missouri.

Similarly, some laws restrict coverage to situations in which the driver is licensed in that state. North Carolina's law applies to "Every driver required to have a North Carolina driver's license . . ." Of the 134 deaths in that state, 21 (16 per cent) were children being driven by persons licensed in other states.

Most states exempt certain types of vehicles. Wyoming, the last state to pass a child restraint law, exempted pickup trucks, for example. Of the 30 children under 6 years of age killed in Wyoming, eight (27 per cent) were occupants of pickup trucks.

As a public health innovation, child restraint laws have been rapidly and widely accepted. In less than a decade, all of the states have legislatively addressed this leading cause of death among children, but the lack of uniformity in these laws can lead to ambiguous and inconsistent occupant protection for children. For example, if Vermont parents of two children, ages 1 and 4, were to drive through the New England states, they would have the following legal obligations:

- In Vermont, the 1 year old child must be restrained in either a seat belt or a child restraint, unless in the front seat, in which case a child restraint must be used. The 4 year old need not be restrained.
- In Maine, no restraints would be required for either child, because the car is not registered in Maine.
- In New Hampshire and Massachusetts, both children must be in either seat belts or child restraints.
- In Rhode Island, the 1 year old must be in a child restraint, and the 4 year old need not be restrained.
- In Connecticut, the 1 year old can be in either a child restraint or seat belt, but the 4 year old need not be restrained.

Uniformity among the laws of the states would reduce ambiguities, facilitate compliance with the laws, and enhance protection if comprehensive uniform laws are chosen. Because all states now require child restraint use, there is little reason to exempt a vehicle from coverage because it is registered or its driver is licensed in another state.

This examination of childhood motor vehicle deaths on a state-by-state basis has shown that many deaths subse-

quently might not have been prevented because the children would have been excluded from a child restraint law's coverage on the basis of the child's age. In addition, 15 per cent of the children whose ages were covered by subsequent laws would actually have escaped coverage because of unnecessary restrictions regarding vehicle registration, vehicle type, or driver licensure. If 15 per cent or more of children in the United States were not protected against preventable disease due to gaps in immunization laws, it would be considered unacceptable. An awareness of these gaps in coverage is important for legislators in reviewing and amending current child restraint laws.

Laws designed to protect a class of persons at risk of injury, particularly a class of persons who cannot protect themselves, should not have unnecessary exceptions to coverage. Data that measure the effect of a law's provisions on its intended coverage are essential to an informed legislative process. Quantifying the exemptions to child restraint laws shows that they may be more costly than initially perceived, and, therefore, amendment of the laws to expand their coverage is warranted.

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